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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,521	08/29/2001	David W. Minsek	102162-200	9626

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WIGGIN & DANA LLP
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EXAMINER
HAMILTON, CYNTHIA

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/942,521	Applicant(s) MINSEK ET AL.	
	Examiner Cynthia Hamilton	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 1 (a) and (b) components are present at about 75% to about 95% for (a) and 5% to about 25% for (b). There is never an explanation as to what makes up 100%. The examples of the specification have (%a) + (%b) = 100%. If (a) is maximum 95% and (b) is miniumum 5% there is no indication the photoacid generator or the optional surfactant mentioned in the specification could be part of the possible 20%, i.e. (75% a and 5% b). The examiner is unsure whether 100% is (a) + (b) or 100% is the total weight of resin and reactive diluent as evidenced by adding photoacid generator by parts per hundred parts of resin and reactive diluent. If a different epoxy resin is added to the composition, is it limited to the 20 % that is left?

b. In the last line of claim 1, the composition of (a +b +c) is dissolved in "a sufficient amount of coating solvent. The examiner is unsure what sufficiency is being met by this "sufficient amount". Is it coating ability? Where is the guidance for this sufficiency? Is the sufficiency directed to solubility of components (a), (b) and (c)? Is

the solvent that used for (c) such as triaryl sulfonium hexafluoroantimonate salt so it can be dissolved?

For these reasons, claims 1-4 are found confusing to the examiner. She does not believe there is sufficient clarity in this language even in view of the specification to allow a worker of ordinary skill in the art to understand the limits of the claimed invention.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Janke et al (5,726,216) optionally in view of applicants' disclosure of well know prior art on page 2 of their specification and Schrader (4,474,929) and Gelorme et al (4,882,245). Janke et al teaches the instant composition with the exception of specifically combining the listed epoxidized polyfunctional bisphenol A formaldehyde novolak resin more specifically SU -8, with the polyol more specifically Tone 0301, 0305 or 0310 polycaprolactone polyol reactive diluent and with the triaryl sulfonium hexafluoroantimonate salt Cyracure UV I-6974. However, Janke et al does teach as do applicants that radiation cured epoxy resins incorporating cationic photoinitiators tend to be very brittle. Schrader supports this point with respect to SU-8 in particular in his col. 1 disclosure so supports Janke et al specifically in regard to SU-8 resins. Gelorme et al in their examples also report the brittle nature of SU-8 photoresists. Gelorme addresses the problem by using other epoxies as reactive diluents to reduce the brittle nature of the SU -8 resin. In

Gelorme, see particularly column 4 and examples. Janke et al are concerned with a broad group of epoxy resins including the same SU-8 epoxidized polyfunctional bisphenol A formaldehyde novolak resin which is applicant's sole concern. Janke et al's solution is broader than that of applicants in that they believe what was needed was a means by which radiation cured cationic epoxies can be toughened and still retain the good thermal and mechanical properties of the original composition. They do that by teaching the incorporation of toughening with the epoxy resin initiator mixture. These toughening agents include thermoplastics, hydroxy-containing thermoplastic oligomers, epoxy-containing thermoplastic oligomers, reactive flexibilizers, elastomers, rubbers, and mixtures thereof. An additional advantage Janke et al teach is obtained by the use of low viscosity reactive flexibilizers to reduce the overall viscosity of the uncured resin mixture. Incorporation of one or more of these toughening agents has resulted in increases in toughness of more than 230% over that of the untoughened epoxy resin according to Janke et al. Thus, with respect to instant claims 1-4, the use of any of the epoxy resins of Janke et al listed inclusive of epoxidized polyfunctional bisphenol A formaldehyde novolak resin with known photoinitiators as listed such as the triaryl sulfonium hexafluoroantimonate salt Cyracure UV I-6974 mixed with any of the flexibilizers of Janke et al found compatible would have been prima facie obvious to obtain a less brittle cured epoxy composition. The modifying of the epoxy resin with various polyol additives such as ethylene glycol as reactive diluent is also taught separate from adding the flexibilizer. Gelorme et al in col. 4 of his disclosure does not limit his reactive diluents to epoxies. In lines 25-33, is stated "other suitable reactive diluents will readily come to mind to those ordinary skill in resin technologies." In Janke et al, see particularly the Abstract, col. 1, lines 15-21, col. 2, lines 35-55, col. 3, lines 40 to col. 4, lines 47,

col. 5, lines 32-33, col. 6, lines 46-col. 7, lines 28, col. 8, lines 1-30, lines 62 to col. 9, lines 20 and lines 56-61, col. 10, lines 11-24, col. 14, lines 30-59. Thus, the prior art teaches adding the caprolactones to epoxy resins for the same reason applicants add them to their epoxy resin compositions. The ranges of percentage of the toughener of Janke et al to epoxy resin is found in Tables 1-3 to be from 5 to 30 weight %. Thus, workers of ordinary skill in the epoxy art would recognize that the SU-8 resins would be mixed with a flexibilizer in the same general amount to obtain a tougher cured coating as set forth by Janke et al. Applicants on page 2 of their specification make clear all but the use of the polyol with respect to the thick film resists using SU-8 is known. The addition of a flexibilizer as taught by Janke et al to reduce the known brittle nature of the epoxy resin would have been prima facie obvious as well. The examiner does note however that Janke et al alone makes the instant compositions of claim 1-4 obvious over the prior art in her opinion.

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gelorme et al (4,882,245) in view of Janke et al (5,726,216). Gelorme et al teach the instant compositions with the exception of the polyol being used to reduce the brittle nature of the epoxidized polyfunctional bisphenol A formaldehyde novolak resin more specifically SU -8 resin. Gelorme et al addresses the same problem with the addition of 12 to 17 wt % of (b) a reactive diluent also effective as a plasticizer. The actual ones used by Gelorme et al are all epoxy compounds. . Gelorme et al in col. 4 of his disclosure does not limit his reactive diluents to epoxies. In lines 25-33, is stated "other suitable reactive diluents will readily come to mind to those ordinary skill in resin technologies." Such reactive diluents other than epoxies are known in the resin

technologies are set forth by Janke et al. The modifying of the epoxy resin with various polyol additives such as ethylene glycol as reactive diluent is also taught separate from adding the flexibilizer his polycaprolactone flexibilizer. In col. 9, lines 17-20, Janke et al states hydroxy groups are reactive with epoxies and in the paragraph bridging col. 6-8, Janke et al sets forth such known reactive diluents. Thus, with respect to instant claims 1-3, the use of the polyols of col. 6 of Janke et al as (b) components in Gelorme et al would have been prima facie obvious. With respect to instant claim 4, the use of the flexibilizer of Janke et al, to toughen the compositions of Gelorme et al would also have been an obvious variant to reduce the brittle nature of the SU - 8 resists. In Janke et al, see particularly the Abstract, col. 1, lines 15-21, col. 2, lines 35-55, col. 3, lines 40 to col. 4, lines 47, col. 5, lines 32-33, col. 6, lines 46-col. 7, lines 28, col. 8, lines 1-30, lines 62 to col. 9, lines 20 and lines 56-61, col. 10, lines 11-24, col. 14, lines 30-59. Janke et al's solution is broader than that of applicants in that they believe what was needed was a means by which radiation cured cationic epoxies can be toughened and still retain the good thermal and mechanical properties of the original composition. They do that by teaching the incorporation of toughening with the epoxy resin initiator mixture. These toughening agents include thermoplastics, hydroxy-containing thermoplastic oligomers, epoxy-containing thermoplastic oligomers, reactive flexibilizers, elastomers, rubbers, and mixtures thereof. An additional advantage Janke et al teach is obtained by the use of low viscosity reactive flexibilizers to reduce the overall viscosity of the uncured resin mixture. Incorporation of one or more of these toughening agents has resulted in increases in toughness of more than 230% over that of the untoughened epoxy resin according to Janke et al.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Day et al (5,278,010) cited by applicants discloses polyols (PKHC as a phenoxy polyol resin) mixed with SU-8 epoxy resins. The weight ratios do not fit those of the instant invention nor does the examiner believe that the worker of ordinary skill in the art would consider the solid PKHC resin to be classified as a diluent since dilution is usually considered to be limited the addition of liquid.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Primary Examiner Cynthia Hamilton whose telephone number is (703) 308-3626. The examiner can normally be reached on Monday-Friday, 9:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on (703) 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of papers not received regarding this communication or earlier communications, or of a general nature or relating to the status of this application or proceeding should be directed should be directed to the Customer Service Center of Technology Center 1700 whose telephone number is (703) 306-5665.

Cynthia Hamilton
February 9, 2003

CYNTHIA HAMILTON
PRIMARY EXAMINER